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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/722,776

11/26/2003

Haixun Wang

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EXAMINER

BITAR, NANCY

ART UNIT

PAPER NUMBER

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/722,776	<b>Applicant(s)</b> WANG ET AL.	
	<b>Examiner</b> NANCY BITAR	<b>Art Unit</b> 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 May 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Response to Arguments***

1. Applicant's response to the last Office Action, filed 01/22/2009, has been entered and made of record.
2. Applicant has amended claims 1,18-20. , Claims 1-20 are currently pending.
3. Applicant's arguments, in the amendment filed 5/22/2009, with respect to the rejections of claims 1-20 under 35 U.S.C103 (a) have been fully considered but are moot in view of the new ground(s) of rejection necessitated by the amendments. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Aono et al ( US 2004/0162834)

**Examiner Notes**

4. Examiner cites particular columns and line numbers in the references as applied to the claims below for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner

***Claim Rejections - 35 USC § 101***

5. 35 U.S.C. 101 reads as follows:

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Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim(s) 1-18 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. The Federal Circuit<sup>1</sup>, relying upon Supreme Court precedent<sup>2</sup>, has indicated that a statutory “process” under 35 U.S.C. 101 must (1) be tied to a particular machine or apparatus, or (2) transform a particular article to a different state or thing. This is referred to as the “machine or transformation test”, whereby the recitation of a particular machine or transformation of an article must impose meaningful limits on the claim's scope to impart patent-eligibility (See *Benson*, 409 U.S. at 71-72), and the involvement of the machine or transformation in the claimed process must not merely be insignificant extra-solution activity (See *Flook*, 437 U.S. at 590”). While claim 1 and 18 recite a series of steps or acts to be performed, the claim(s) neither transform an article nor are positively tied to a particular machine that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

NOTE: Regarding the rejection of claims 1-8, please see the Memorandum dated May 15, 2008, "Clarification of Processes under 35 USC § 101" which may be viewed at the following web address:

[http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/section101\\_05\\_15\\_2008.pdf](http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/section101_05_15_2008.pdf)

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<sup>1</sup> *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

<sup>2</sup> *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al (Clustering by Pattern Similarity in Large data Sets, ACM SIGMOD' 2002 June 4-6, Madison Wisconsin, USA) in view of Aono et al ( US 2004/0162834)

As to claim 1, Wang teaches a method for use in finding near-neighbors in a set of objects comprising the steps of: identifying subspace pattern similarities that the objects in the set exhibit in multi-dimensional spaces (identifying subspace clusters in high-dimensional data sets, section 1.3); and defining subspace correlations between in the set and each of or more remaining objects in the set based on the identified subspace pattern similarities for use in identifying near-neighbor objects. Wang discloses clustering by pattern similarity in large data sets (see abstract), including the further limitation wherein the distance function -comprises the following: given two data objects  $x$  and  $y$ , a subspace  $S$ , and a dimension  $k \in S$ , the sequence-based distance between  $x$  and  $y$  is as follows:  $\text{dist}_{k, S}(x, y) = \max_{i \in S} (x_i - y_i) - (x_k - y_k)$  (see section 4.1: Pair wise Clustering, column 2, lines 1-7; in order to increase the efficiency of determining the pattern similarity) . While Wang meets a number of the limitations of the claimed invention, as pointed out more fully above, Wang fails to specifically teach the defining

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subspace correlations between one of the objects in the set and each of or more remaining objects in the set based on the identified subspace pattern similarities for use in identifying near-neighbor objects

Specifically, Aono et al. teaches a method for information processing, said information being stored in a database of documents and including attributes, said information at least including a vector of numeral elements and information identifiers to form a matrix, said vector being a node in a hierarchy structure of said information, said method comprising the steps of: transforming documents in the database into vectors using a vector space model to create a document-keyword matrix; reducing a dimension of said matrix to a predetermined order to provide a dimension reduced matrix; randomly assigning vectors of said dimension-reduced matrix to a set of nodes; constructing a hierarchy structure of said nodes, where the document-keyword vectors are introduced with the hierarchy structure using distance between the document-keyword vectors said hierarchy structure being layered with hierarchy levels starting from a top node; determining parent nodes and child nodes thereof between adjacent hierarchy levels, said parent nodes being included in an upper level and said child nodes being included in a lower level; generating relations between said parent nodes and said child nodes by providing pointers to said parent nodes and said child nodes in relation to said distance; registering pointers by starting from a node pair having closest distance until a predetermined number of pairs being generated, providing a similarity-based query to rank said nodes with respect to said query; executing a similarity-based information retrieval (near-neighbor objects) using the document-keyword matrix; selecting said nodes to generate a cluster including said ranked nodes with respect to said query. Note that Aono teaches similarity ranking and/or can be

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combined together with other methods to increase the scalability of information retrieval, detection, ranking, and tracking. it would have been obvious to one of ordinary skill in the art to identify the near neighbor object using the subspace correlation in Wang method in order to compute a relatively fast and accurate computation to narrow the search quickly thus receiving the most accurate possible solution within the time limit. Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claims 2, Aono et al. teaches the method of claim 1, wherein the identifying step further comprises the step of creating a pattern distance index (column 3, lines 20-column 4, and lines 66).

As to claim 3, Wang et al. in view of Aono et al., Aono et al. teaches the method of claim 1, wherein the multi-dimensional spaces comprise arbitrary spaces (arbitrary metric spaces, page 4, Large Metric Spaces, section 3).

As to claims 4- 5, Aono et al. teaches the method of claim 4, wherein the subspace dimensionality is an indicator of a degree of similarity between the objects (column 4, lines 12-49).

As to claim 6, Wang et al. in view of Aono et al., Wang et al. teaches the method of claim 1, wherein data relating to the objects is static (there is no coherence need to be related by shifting or scaling the objects, section 1.4; see also Aono et al column 22, lines 22-54).

As to claim 8, Wang et al. in view of Aono et al., Wang et al. teaches the method of claim 1, wherein data relating to the objects comprises gene expression data (the gene expression data are organized as matrices, section 1.2).

As to claims 7 and 9, Wang et al. in view of Aono et al., Wang et al. teaches the method of claim 1, wherein data relating to the objects comprises synthetic data and dynamic data (synthetic and real life data sets, section 5).

As to claim 10, Wang et al. in view of Aono et al., Aono et al. teaches the method of claim 1, wherein identifying the subspace pattern similarities comprises a comparison of any subset of dimensions in the multi-dimensional spaces (section 4.4, page 9).

As to claim 11, Aono et al., teaches the method of claim 1, wherein identifying the subspace pattern similarities comprises an ordering of dimensions in the multi-dimensional spaces (figure 3 and 5)

. As to claims 12- 13, Wang et al. in view of Aono et al., Wang et al. teaches the method of claim 12, wherein a first pair in the sequence of pairs comprises a base of comparison for one or more remaining pairs in the sequence of pairs (figure 13).

As to claim 14, Aono et al. teaches the method of claim 12, wherein the sequence of pairs is represented sequentially in a tree structure comprising one or more edges and one or more nodes ( figure 5).

As to claim 15, Aono et al. teaches the method of claim 2, wherein creating the pattern distance index comprises use of pattern-distance links (the above registration of the parent-to-child relationships may be implemented using any well known technique, and for example, a



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document identifier, a distance identifier, and a node pointer for indicating the parent or child node may be added to the document-keyword vector and the connection or linkage may be established by referencing such identifiers, i.e., the node pointer, but not limited thereto, the present invention may be implemented by any technique to identify parents and child thereof, figure 4 ).

As to claim 16, Wang et al. in view of Aono et al., Wang et al. teaches the method of claim 1, wherein the process is optimized by maintaining a set of embedded ranges (embed random value ranges from 0-500, section 5.1).

As to claim 17, Aono et al. teaches the method of claim 1, wherein the subspace correlations comprise a distance between two or more of the objects in the set (claim 1 ).

The limitation of claim 18 has been addressed above .

Claims 19-20 differ from claim 1 only in that claims 19-20 are program claims whereas, claim 1 is an apparatus claim. Thus, claims 19-20 are analyzed as previously discussed with respect to claims above.

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to NANCY BITAR whose telephone number is (571)270-1041.

The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nancy Bitar/  
Examiner, Art Unit 2624

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